



Location of MLRA 102C in Land Resource Region M.

102C—Loess Uplands

This area is in Nebraska (77 percent), South Dakota (13 percent), Iowa (6 percent), and Minnesota (4 percent). It makes up about 11,445 square miles (29,655 square kilometers). It includes the towns or cities of Albion, Bloomfield, Hartington, Wayne, Norfolk, West Point, Columbus, and Fremont, Nebraska; Yankton, Sioux Falls, and Vermillion, South Dakota; Canton, Iowa; and Luverne, Minnesota. Interstates 29 and 90 cross parts of this MLRA. Parts of the Santee, Winnebago, and Omaha Indian Reservations are in this area.

Physiography

Most of this area is in the Dissected Till Plains Section of the Central Lowland Province of the Interior Plains. The southwestern third is in the High Plains Section of the Great Plains Province of the Interior Plains. This MLRA has broad, undulating to rolling ridgetops and hilly to steep valley sides. The valleys are generally narrow, but broad flood plains and terraces are along the major rivers and the large tributaries. Elevation ranges from 1,100 to 2,000 feet (335 to 610 meters), increasing from southeast to northwest. Local relief is commonly 5 to 30 feet (2 to 9 meters).

The extent of the major Hydrologic Unit Areas

(identified by four-digit numbers) that make up this MLRA is as follows: Elkhorn (1022), 44 percent; Missouri-Big Sioux (1017), 36 percent; Loup (1021), 9 percent; Platte (1020), 8 percent; Missouri-Little Sioux (1023), 2 percent; and Niobrara (1015), 1 percent. The Big Sioux River forms the boundary between Iowa and South Dakota and joins the Missouri River in this area. The Missouri River is designated as a National Wild and Scenic River near Vermillion, South Dakota. The Elkhorn River, a major tributary to the Platte River in Nebraska, occurs in this area.

Geology

Loess covers most of this area. It consists of pale brown or light grayish brown, calcareous, silty material deposited by the wind. The loess is mainly of Peorian age. It ranges from 6 to 70 feet (2 to 20 meters) in thickness. Deposits of glacial till underlie the loess in most of the area. The till is more than 200 feet thick (60 meters) in some areas. Where no glacial deposits occur, bedrock generally is at or near the surface, except in areas where deposits of Pleistocene sand and gravel fill the principal stream valleys. The glacial till is underlain by deposits of Pleistocene sand and gravel in some buried bedrock valleys. It rests directly on bedrock, however, throughout much of the area. The Dakota Sandstone, a bedrock formation of Cretaceous age, underlies all but the southeastern part of the area, where rocks of Pennsylvanian age are at or near the surface. The Dakota Sandstone is exposed in many areas along the eastern boundary of the area for a distance of 50 miles south from the town of Ponca. Westward from a north-south line through Ponca, however, it is progressively more deeply buried.

Climate

The average annual precipitation in this area is 23 to 30 inches (585 to 760 millimeters). Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. The maximum precipitation occurs from the middle of spring to early in autumn. Precipitation in winter occurs as snow. The annual snowfall ranges from about 24 inches (60 centimeters) in the southern part of the area to 34 inches (85 centimeters) in the northern part. The average annual temperature is 43 to 51 degrees F (6 to 11 degrees C). The freeze-free period averages about 170 days and ranges from 150 to 190 days, increasing in length from northwest to southeast.

Water

Following are the estimated withdrawals of freshwater by use in this MLRA:

Public supply—surface water, 0.6%; ground water, 10.9% Livestock—surface water, 0.1%; ground water, 0.6% Irrigation—surface water, 22.0%; ground water, 54.3% Other—surface water, 9.0%; ground water, 2.4%

The total withdrawals average 1,135 million gallons per day (4,295 million liters per day). About 68 percent is from ground water sources, and 32 percent is from surface water sources. Precipitation is the principal source of moisture for crops. In some years it is inadequate for maximum crop production. The water in the Missouri River is of very good quality and is suitable for most uses with minimal treatment. Sediment, nutrients, and pesticides from agricultural activities impair the other major rivers in this area, but the surface water is still used for livestock, irrigation, public supply, and industry in parts of the area.

Ground water is obtained from shallow alluvial and glacial meltwater deposits of unconsolidated sand and gravel throughout most of this area. The water in these shallow aquifers has a median level of total dissolved solids of 350 to 390 parts per million (milligrams per liter) in the part of this area in Nebraska and 690 parts per million (milligrams per liter) in the part in South Dakota. It is typically a calcium-magnesium-bicarbonate type of water that is very hard. The glacial till is a poor source of ground water; yields to wells are small to negligible, and the water is commonly highly mineralized. Locally thick deposits of Pleistocene sand and gravel yield moderate or moderately large supplies of good-quality water to wells. The ground water in this MLRA is used for domestic purposes, livestock, irrigation, public supply, and industry.

The Cretaceous-age Dakota Sandstone is at a shallow or moderate depth in the eastern part of this area. It is tapped by many domestic and livestock wells. Not very many irrigation wells tap this aquifer, but a number of communities in eastern Nebraska obtain their public supplies from it. Locally, the Dakota Sandstone has beds of gravel at its base. Moderately large yields can be obtained from these beds. Water quality varies in this bedrock aquifer, depending on whether the aquifer is being recharged locally, whether it has been leached of salts, and whether the

residence time of the water within the aquifer has been long. Calcium is the principal cation in the ground water where the Dakota Sandstone is being recharged locally or where it has been leached. Sodium is the dominant cation in the water of poorer quality where no local recharge occurs, the salts in the aquifer have not been leached, or the water has been in the aquifer for a long time. The water from the Dakota Sandstone is very hard. Other bedrock formations in the area are generally poor sources of water.

Soils

The dominant soil order in this MLRA is Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an ustic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, moderately well drained to somewhat excessively drained, and loamy or clayey. Haplustolls formed in loess on uplands (Belfore, Moody, and Nora series), in loess over outwash on uplands (Dempster and Graceville series), in colluvium and alluvium on footslopes (Alcester series), and in eolian deposits on uplands (Flandreau, Grovena, and Thurman series). Endoaquolls (Colo, Gibbon, and Zook series) formed in alluvium on flood plains. Ustorthents (Crofton series) formed in loess in steep areas on uplands. Fluvaquents (Albaton series) and Udifluvents (Blake and Grable series) formed in alluvium on the Missouri River flood plain.

Biological Resources

This area supports natural prairie vegetation. Little bluestem, big bluestem, switchgrass, western wheatgrass, and sideoats grama characterize the vegetation on loamy soils. Porcupine, green needlegrass, and western wheatgrass characterize the vegetation on clayey soils on uplands.

Some of the major wildlife species in this area are mule deer, white-tailed deer, coyote, raccoon, pheasant, bobwhite quail, mourning dove, and meadowlark. The species of fish in the area include smallmouth bass, bluegill, channel catfish, and black bullhead.

Land Use

Following are the various kinds of land use in this MLRA:

Cropland—private, 74%

Grassland—private, 16%

Forest—private, 2%

Urban development—private, 4%

Water—private, 1%

Other—private, 3% Major Land Resource Areas

Nearly all of this area is farmed. More than 70 percent of the area is cropland used mainly for corn and soybeans. Feed grains and hay crops also are widely grown. About 20 percent of the area is irrigated. Corn, alfalfa, small grains, and grass hay are grown extensively in the irrigated areas. The areas consisting of hilly and steep slopes bordering the drainageways support native grasses and shrubs used for grazing.

The major soil resource concerns are wind erosion, water erosion, maintenance of the content of organic matter and tilth of the soils, and soil moisture management. Soils that formed in Peorian Loess are highly susceptible to water erosion. Pasture and rangeland are subject to wind erosion and water erosion when the plant cover is depleted by overgrazing. Conservation practices on cropland generally include high-residue crops in the cropping system, systems of crop residue management (such as no-till and mulch-till systems), level terraces, contour farming, contour stripcropping, irrigation water management, and nutrient management. Conservation practices on pasture and rangeland generally include fences and proper grazing management.